CLAIMS

1. (Currently amended) A gradient domain compression system for generating, from an input image having a high luminance dynamic range, an output image having a lower luminance dynamic range, the system comprising:

A. (a) a gradient image generator module configured to generate, from the input image, a gradient image representing, for respective points of the input image, gradients values in the luminance of the input image wherein gradients comprise a vector of at least two-dimensions;

B. (b) a gradient compression module configured to receive the gradient image and generate a compressed range gradient image in which the range of gradients values are compressed; and

C. (c) an output image generator module configured to receive the compressed range gradient image and to generate therefrom an image, the image generated by the output image generator module comprising the output image.

2. (Currently amended) A system as defined in claim 1 in which the gradient compression module comprises:

A. (a) a gradient attenuation function generator module configured to generate, for respective points in the gradient image, a gradient attenuation function whose value for respective points in the gradient image is configured to reduce the range of gradients values in the gradient image; and

B. (b) an attenuated image gradient generator module configured to generate, from the gradient image and the gradient attenuation function, the compressed range gradient image.

3. (Currently amended) A system as defined in claim 2 in which the gradient attenuation function generator module is configured to generate the gradient attenuation function to provide values for respective points of the gradient image so as to reduce relatively high gradients values in a progressive manner, such that higher gradients values are reduced more than lower gradients values.

4. (Currently amended) A system as defined in claim 2 in which the gradient attenuation function generator module is configured to generate the gradient

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attenuation function to provide values for respective points of the gradient image so as to increase relatively low gradients ~~values~~ in a progressive manner, such that lower gradients ~~values~~ are increased more than higher gradients ~~values~~.

5. (Currently amended) A system as defined in claim 2 in which the gradient attenuation function generator module is configured to generate the gradient attenuation function whose value for respective points in the gradient image is configured to reduce the range of gradients ~~values~~ in the gradient image around a selected gradient ~~value~~ in the gradient image.

6. (Currently amended) A system as defined in claim 2 in which the gradient attenuation function generator comprises:

~~A.~~ (a) a Gaussian pyramid generator module configured to generate a Gaussian pyramid comprising a series of levels, each level of the Gaussian pyramid comprising a level gradient image having a reduced resolution than the level gradient image of the preceding level in the series;

~~B.~~ (b) a level scaling factor generator module configured to generate, for respective levels gradient images of the Gaussian pyramid, a respective level scaling factor representative of the gradient attenuation function at the particular level; and

~~C.~~ (c) a scaling factor propagator module configured to propagate the level scaling factors through the Gaussian pyramid, thereby to generate the gradient attenuation function for use by the attenuated image gradient generator module.

7. (Original) A system as defined in claim 1 in which output image generator module is configured to generate the output image as the image that is close to the compressed range gradient image in a least-squares sense.

8. (Original) A system as defined in claim 7 in which the output image generator module is configured to generate the output image in such that the Laplacian of the output image corresponds to the divergence of the compressed range gradient image.

9. (Original) A system as defined in claim 1 further comprising a preprocessor module configured to generate, in response to the input image, a preprocessed image

comprising the logarithm of the input image, the gradient image generator module being configured to use the preprocessed image as its input image.

10. (Original) A system as defined in claim 1 further comprising a post-processor module configured to generate, in response to the output image generated by the output image generator module, a post- processed image comprising the exponential of the output image, the post-processed image comprising the output image of the system.

11. (Currently amended) A gradient domain compression method of generating, from an input image having a high luminance dynamic range, an output image having a lower luminance dynamic range, the method comprising:

    A. (a) a gradient image generator step of generating, from the input image, a gradient image representing, for respective points of the input image, gradients ~~values~~ in the luminance of the input image wherein gradients comprise a vector of at least two-dimensions;

    B. (b) a gradient compression step of receiving the gradient image and generating a compressed range gradient image in which the range of gradients ~~values~~ are compressed; and

    C. (c) an output image generator step of receiving the compressed range gradient image and generating therefrom an image, the image generated during the output image generator step comprising the output image.

12. (Currently amended) A method as defined in claim 11 in which the gradient compression step comprises:

    A. (a) a gradient attenuation function generator step of generating, for respective points in the gradient image, a gradient attenuation function whose value for respective points in the gradient image is configured to reduce the range of gradients ~~values~~ in the gradient image; and

    B. (b) an attenuated image gradient generator step of generating, from the gradient image and the gradient attenuation function, the compressed range gradient image.

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13. (Currently amended) A method as defined in claim 12 in which the gradient attenuation function generator step includes the step of generating the gradient attenuation function to provide values for respective points of the gradient image so as to reduce relatively high gradients ~~values~~ in a progressive manner, such that higher gradients ~~values~~ are reduced more than lower gradients ~~values~~.

14. (Currently amended) A method as defined in claim 12 in which the gradient attenuation function generator step includes the step of generating the gradient attenuation function to provide values for respective points of the gradient image so as to increase relatively low gradients ~~values~~ in a progressive manner, such that lower gradients are increased more than higher gradients ~~values~~.

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15. (Currently amended) A method as defined in claim 12 in which the gradient attenuation function generator step includes the step of generating the gradient attenuation function whose value for respective points in the gradient image is configured to reduce the range of gradients ~~values~~ in the gradient image around a selected gradient ~~value~~ in the gradient image.

16. (Currently amended) A method as defined in claim 12 in which the gradient attenuation function generator step comprises:

~~A.~~ (a) a Gaussian pyramid generator step of generating a Gaussian pyramid comprising a series of levels, each level of the Gaussian pyramid comprising a level gradient image having a reduced resolution than the level gradient image of the preceding level in the series;

~~B.~~ (b) a level scaling factor generator step of generating, for respective levels gradient images of the Gaussian pyramid, a respective level scaling factor representative of the gradient attenuation function at the particular level; and

~~C.~~ (c) a scaling factor propagator step of propagating module the level scaling factors through the Gaussian pyramid, thereby to generate the gradient attenuation function for use during the attenuated image gradient generator step.

17. (Original) A method as defined in claim 11 in which output image generator step includes the step of generating the output image as the image that is close to the compressed range gradient image in a least-squares sense.

18. (Original) A method as defined in claim 17 in which the output image generator step includes the step of generating the output image in such that the Laplacian of the output image corresponds to the divergence of the compressed range gradient image.

19. (Original) A method as defined in claim 11 further comprising a preprocessor step of generating, in response to the input image, a preprocessed image comprising the logarithm of the input image, the gradient image generator step making use of the preprocessed image as its input image.

20. (Currently amended) A method as defined in claim 11 further comprising a post-processor configured ~~configured~~ to generate, in response to the output image generated by the output image generator module, a post- processed image comprising the exponential of the output image, the post-processed image comprising the output image of the method.

21. (Currently amended) A computer program product for use in connection with a computer to provide a gradient domain compression system for generating, from an input image having a high luminance dynamic range, an output image having a lower luminance dynamic range, the computer program product comprising a computer-readable medium having encoded thereon:

    ~~A.~~ (a) a gradient image generator module configured to enable the computer to generate, from the input image, a gradient image representing, for respective points of the input image, gradient<u>s</u> ~~values~~ in the luminance of the input image <u>wherein gradients comprise a vector of at least two-dimensions</u>;

    ~~B.~~ (b) a gradient compression module configured to enable the computer to receive the gradient image and generate a compressed range gradient image in which the range of gradient<u>s</u> ~~values~~ are compressed; and

    ~~C.~~ (c) an output image generator module configured to enable the computer to receive the compressed range gradient image and to generate therefrom an image, the image generated by the output image generator module comprising the output image.

22. (Currently amended) A computer program product as defined in claim 21 in which the gradient compression module comprises:

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~~A.~~ (a) a gradient attenuation function generator module configured to enable
the computer to generate, for respective points in the gradient image, a gradient
attenuation function whose value for respective points in the gradient image is
configured to enable the computer to reduce the range of gradient~~s~~ ~~values~~ in the
gradient image; and

~~B.~~ (b) an attenuated image gradient generator module configured to enable the
computer to generate, from the gradient image and the gradient attenuation function,
the compressed range gradient image.

23. (Currently amended) A computer program product as defined in claim 22 in which
the gradient attenuation function generator module is configured to enable the
computer to generate the gradient attenuation function to provide values for respective
points of the gradient image so as to reduce relatively high gradient~~s~~ ~~values~~ in a
progressive manner, such that higher gradient~~s~~ ~~values~~ are reduced more than lower
gradient~~s~~ ~~values~~.

24. (Currently amended) A computer program product as defined in claim 22 in which
the gradient attenuation function generator module is configured to enable the
computer to generate the gradient attenuation function to provide values for respective
points of the gradient image so as to increase relatively low gradient~~s~~ ~~values~~ in a
progressive manner, such that lower gradient~~s~~ ~~values~~ are increased more than higher
gradient~~s~~ ~~values~~.

25. (Currently amended) A computer program product as defined in claim 22 in which
the gradient attenuation function generator module is configured to enable the
computer to generate the gradient attenuation function whose value for respective
points in the gradient image is configured to enable the computer to reduce the range
of gradient~~s~~ ~~values~~ in the gradient image around a selected gradient ~~value~~ in the
gradient image.

26. (Currently amended) A computer program product as defined in claim 22 in which
the gradient attenuation function generator comprises:
~~A.~~ (a) a Gaussian pyramid generator module configured to enable the
computer to generate a Gaussian pyramid comprising a series of levels, each level of

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the Gaussian pyramid comprising a level gradient image having a reduced resolution than the level gradient image of the preceding level in the series;

~~B.~~ (b) a level scaling factor generator module configured to enable the computer to generate, for respective levels gradient images of the Gaussian pyramid, a respective level scaling factor representative of the gradient attenuation function at the particular level; and

~~C.~~ (c) a scaling factor propagator module configured to enable the computer to propagate the level scaling factors through the Gaussian pyramid, thereby to generate the gradient attenuation function for use by the attenuated image gradient generator module.

27. (Original) A computer program product as defined in claim 21 in which output image generator module is configured to enable the computer to generate the output image as the image that is close to the compressed range gradient image in a least-squares sense.

28. (Original) A computer program product as defined in claim 27 in which the output image generator module is configured to enable the computer to generate the output image in such that the Laplacian of the output image corresponds to the divergence of the compressed range gradient image.

29. (Original) A computer program product as defined in claim 21 further comprising a preprocessor module configured to enable the computer to generate, in response to the input image, a preprocessed image comprising the logarithm of the input image, the gradient image generator module being configured to enable the computer to use the preprocessed image as its input image.

30. (Original) A computer program product as defined in claim 21 further comprising a post-processor module configured to enable the computer to generate, in response to the output image generated by the output image generator module, a post-processed image comprising the exponential of the output image, the post-processed image comprising the output image of the system.

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